EXAM PAPERS PRACTICE

Boost your performance and confidence with these topic-based exam questions

Practice questions created by actual examiners and assessment experts

Detailed mark scheme

Suitable for all boards

Designed to test your ability and

11.2 Movement

Hard

BIOLOGY

IB HL

EXAM PAPERS PRACTICE

11.2 Movement

Question Paper

Course	DP IB Biology
Section	11. Animal Physiology (HL Only)
Topic	11.2 Movement
Difficulty	Hard

Time allowed: 10

Score: /5

Percentage: /100

Question 1

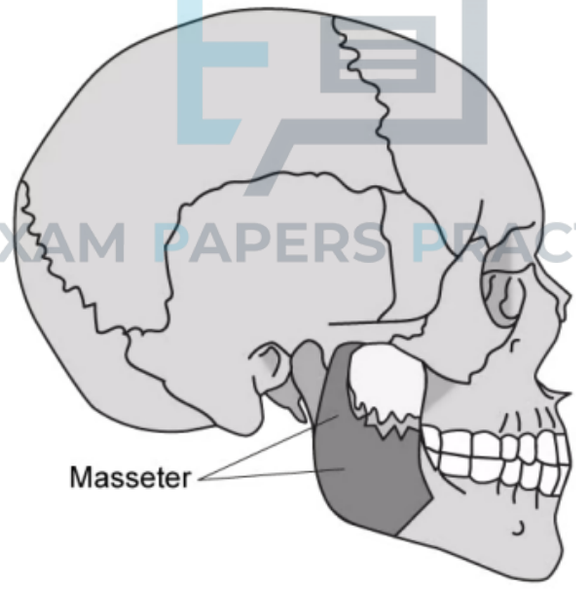
Which row of the table best describes the roles of calcium and ATP in muscle contraction?

	Calcium	ATP
A	Binds to the tropomyosin during muscle contraction to trigger movement of the troponin	Hydrolysed to ADP and Pi to release energy to allow crossbridge formation
B	Released from the sarcomere in response to an action potential reaching the neuromuscular junction	Binds to myosin heads resulting in 'cocking' of the myosin head
C	Binds to myosin heads to allow crossbridge formation	Attaches to binding sites on the troponin to trigger the movement of tropomyosin
D	Binds to the troponin to cause a change in structure and open up binding sites on actin molecules	Binds to the myosin heads producing a change in shape resulting in the release of the actin filament

[1 mark]

Question 2

The masseter is the strongest muscle in the human body and is responsible for lifting the lower jaw to close the mouth. The location of the masseter can be seen in the diagram.



Which of the following is **not** an event which would occur in the masseter as the jaw is moved towards its closed position?

A. Myosin heads perform a power stroke which is driven by energy released in the hydrolysis of ATP

B. The sarcomeres shorten as the Z lines are pulled together but the A band remains the same length.

C. Calcium ions are actively pumped back into the sarcoplasmic reticulum and tropomyosin covers binding sites

D. Troponin complexes change shape leading to the exposure of binding sites on actin molecules

Question 3

Polymyositis (PM) is an autoimmune disease of the muscles in which T-cells and B-cells are activated by antigens located on striated muscles of the body.

Which of the following statements is unlikely to result from polymyositis?

A. Muscle biopsies of patients shows increased levels of antibodies

B. Blood pressure may decrease as vascular muscle deteriorates

C. Patients exhibit weakening of biceps and triceps muscles

D. Progression of the disease may result in poor posture

[1 mark]

Question 4

Isolated muscle fibres from frogs were injected with fluorescent indicator to allow the study of muscle contraction.

Fluorescent proteins extracted from the jellyfish species *Aequorea victoria* showed the processes occurring in the sarcomere during muscle contraction.

Which of the following is/are true about the indicator?

I. It is sensitive to calcium ions
II. It contains aequorin
III. It shows the intensity of muscle contraction

A. I, II and III

B. I and III only

C. I only

D. I and II only

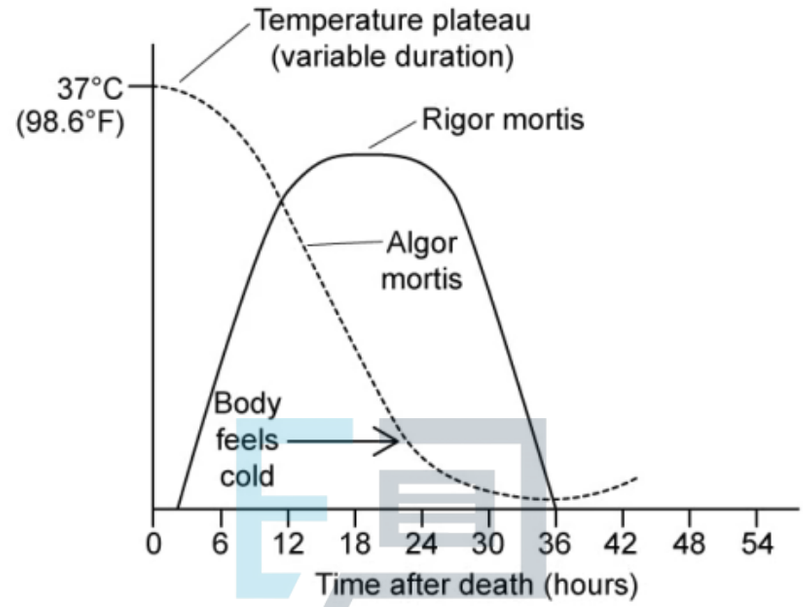
[1 mark]

Question 5

Rigor mortis describes the stiffening of body muscles due to chemical change in myofibrils after death. Knowledge of the stages of *rigor mortis* allows pathologists to estimate the time of death accurately.

Algor mortis refers to the gradual decrease in the body's temperature after death.

The graph shows the onset of *Rigor mortis* and *Algor mortis* after death.



Which of the following options shows a valid explanation for the trends shown in the graph?

	Trend	Explanation
A	Body temperature decreases from 0 to 36 hours after death	Calcium is not replenished due to lack of ATP
B	*Rigor mortis* peaks at 12 hours after death	ATP is no longer available to break actin-myosin cross bridges
C	Body temperature increases slightly 36 hours after death	Energy is released from hydrolysis of the remaining ATP
D	*Rigor mortis* increases gradually after death	ATP becomes depleted so muscles cannot remain relaxed.

[1 mark]